

Form PTO-449
(REV. 8-88)U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

ATTY. DOCKET NO.

015685.P019C

SERIAL NO.

09/689,228

INFORMATION DISCLOSURE CITATION

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APPLICANT

Craig H. Barratt

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U.S. PATENT DOCUMENTS

*EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
<i>B</i>	3,704,465	11/28/72	Masak et al.	—	—	
<i>B</i>	3,774,209	11/20/73	Fleming et al.	—	—	
	3,798,645	03/19/74	Baurle et al.	—	—	
	3,852,749	12/03/74	Kohler	—	—	
	3,946,385	03/23/76	Ewen	—	—	
	4,005,379	01/25/77	Lerner	—	—	
	4,035,746	07/12/77	Covington Jr.	—	—	
	4,085,319	04/18/78	Deitz et al.	—	—	
	4,128,740	12/05/78	Graziano	—	—	
	4,263,568	04/21/81	Nemit	—	—	
	4,316,191	02/16/82	Sawatari et al.	—	—	

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FOREIGN PATENT DOCUMENTS

DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
					YES	NO
<i>B</i> 2 237 706 A	5/8/91	United Kingdom	—	—		
<i>B</i> 2 295 524 A	5/29/96	United Kingdom	—	—		
<i>B</i> 2 313 261 A	11/19/97	United Kingdom	—	—		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

<i>B</i>	Acampora et al., "A New Adaptive MAC Layer Protocol for Wireless ATM Networks in Harsh Fading and Interference Environments", 1997 IEEE, pp. 410-415.
<i>B</i>	Agee, "Blind Separation and Capture of Communication Signals Using A Multitarget Constant Modulus Beamformer", 10/7/89 Proc. IEEE Military Communications Conference, Vol. 2, pp. 1-12.
<i>B</i>	Aschied et al., "An All Digital Receiver Architecture for Bandwidth Efficient Transmission at High Data Rates", 1989, IEEE Transactions on Communications, Vol. 37, No. 8, pp. 804-813.

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<i>B</i>	4,375,622	03/01/83	Hollingsworth et al.	—	—	
<i>B</i>	4,434,505	02/28/84	Gutleber	—	—	
<i>B</i>	4,475,010	10/02/84	Huensch et al.	—	—	
	4,626,859	12/02/86	Stansfield	—	—	
	4,639,732	01/27/87	Acoraci et al.	—	—	
	4,639,914	01/27/87	Winters	—	—	
	4,658,096	04/14/87	West, Jr. et al.	—	—	
	4,737,794	04/12/88	Jones	—	—	
	4,737,975	04/12/88	Shafer	—	—	
	4,742,356	05/03/88	Kuipers	—	—	
	4,750,147	06/07/88	Roy, III et al.	—	—	

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DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
					YES	NO
<i>B</i> 0 639 035 A1	2/15/95	EPO	—	—		
<i>B</i> 0 713 261 A1	5/22/96	EPO	—	—		
<i>B</i> 0 777 400 A2	6/4/97	EPO	—	—		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

<i>B</i>	Franks, "Synchronization Subsystems: Analysis and Design", 1981, Digital Communications Satellite/Earth Station Engineering, pp. 294-335.
<i>B</i>	Friedlander, "Direction Finding Using an Interpolated Array", 4/3/90, International Conference on Acoustics, Speech, and Signal Processing, Vol. 5, pp. 2951-2954.
<i>B</i>	Friedlander et al., "Direction Finding for Wideband Signals Using an Interpolated Array", 1991, IEEE Publication, pp. 583-587.

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B	4,775,997	10/04/88	West Jr. et al.	1	1	
B	4,796,291	01/03/89	Makino	1	1	
B	4,827,395	05/02/89	Anders et al.	1	1	
	4,829,554	05/09/89	Barnes et al.	1	1	
	4,837,800	06/06/89	Freeburg et al.	1	1	
	4,855,748	08/08/89	Brandao et al.	1	1	
	4,910,794	03/20/90	Mahany	1	1	
	4,922,517	05/01/90	West, Jr. et al.	1	1	
	4,926,186	05/15/90	Kelly et al.	1	1	
	4,940,963	07/10/90	Gutman et al.	1	1	
V	4,947,452	08/07/90	Hattori et al.	1	1	

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DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
					YES	NO
B 95/34103	12/14/95	WO	1	1		
B 98/01963	1/15/98	WO	1	1		
B 98/17037	4/23/98	WO	1	1		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

B	Ganz et al., "A Data-Derived Reference Signal Technique for Adaptive Arrays", IEEE Transactions on Communications, Vol. 37, No. 9, 9/1989, pp. 975-983.
B	Ittis et al., "A Digital DS Spread-Spectrum Receiver With Joint Channel and Doppler Shift Estimation", IEEE Transactions on Communications, Vol. 39, No. 8, 8/1991, pp. 1255-1267.
B	Krishnamurthy et al., "Polling Based Media Access Protocols For Use With Smart Adaptive Array Antennas", 1998 IEEE, pp. 337-344.

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<i>B</i>	4,955,082	09/04/90	Hattori et al.	✓	✓	
<i>B</i>	4,965,732	10/23/90	Roy, III et al.	✓	✓	
<i>B</i>	4,965,849	10/23/90	Kunihiro	✓	✓	
	4,965,850	10/23/90	Schloemer	✓	✓	
	4,972,151	11/20/90	Rosen	✓	✓	
	4,989,204	01/29/91	Shimizu et al.	✓	✓	
	5,041,833	08/20/91	Weinberg	✓	✓	
	5,052,799	10/01/91	Sasser et al.	✓	✓	
	5,093,924	03/03/92	Toshiyuki et al.	✓	✓	
	5,103,459	04/07/92	Gilhousen et al.	✓	✓	
	5,109,535	04/28/92	Kume et al.	✓	✓	

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DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO
98/17071	4/23/98	WO	✓	✓	
98/28864	7/2/98	WO	✓	✓	
98/33346	7/30/98	WO	✓	✓	

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

<i>B</i>	Lee et al., "Decision Directed Carrier Recovery - Chapter 16: Carrier Recovery", 1994 Digital Communications, 2nd Edition, Kluwer Academic Pub., pp. 725-736.
<i>B</i>	Lee et al., "Decision Directed Carrier Recovery - Chapter 17: Timing Recovery", 1994 Digital Communications, 2nd Edition, Kluwer Academic Pub., pp. 737-764.
<i>B</i>	Lundell et al., "Applications of the Constant Modulus Adaptive Beamformer to Constant and Non-Constant Modulus Signals", Proceedings, 1998 Asilomar Conference on Signals, Svstems. and Computers (ACSSC-1988). pp. 432-436.

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*EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
B	5,124,697	06/23/92	Moore	✓	✓	
B	5,142,253	08/25/92	Mallavarpu et al.	✓	✓	
B	5,159,593	10/27/92	D'Amico et al.	✓	✓	
	5,255,210	10/19/93	Gardner et al.	✓	✓	
	5,260,968	11/09/93	Gardner et al.	✓	✓	
	5,262,789	11/16/93	Silverstein	✓	✓	
	5,274,844	12/28/93	Harrison et al.	✓	✓	
	5,283,540	02/01/94	Myer	✓	✓	
	5,299,148	03/29/94	Gardner et al.	✓	✓	
	5,335,249	08/02/94	Krueger et al.	✓	✓	
	5,345,596	09/06/94	Buchenhorner et al.	✓	✓	

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DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
					YES	NO
7-170548	4/7/95	Japan	✓	✓		X
			✓	✓		
			✓	✓		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

B	Muhammed et al., "Direction of Arrival Estimation Using Antenna Arrays", 1996, The Bradley Dept. of Electrical Engineering, Mobile and Portable Radio Research Group, Section 3.8, pp. 64-71.
B	vander Veen et al., "A Constant Modulus Factorization Technique for Smart Antenna Applications in Mobile Communications", SPIE 1994 "Advanced Signal Processing Algorithms, Architectures, and Implementations V", Vol. 2296, pp. 230-241.
B	Talwar et al., "Recursive Algorithms for Estimating Multiple Co-Channel Digital Signals Received at an Antenna Array", Proc. Fifth Annual IEEE Dual Use Technologies and Applications Conference.

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<i>[Signature]</i>	5,361,303	11/01/94	Eatwell	—	—	
<i>[Signature]</i>	5,367,559	11/22/94	Kay et al.	—	—	
<i>[Signature]</i>	5,379,320	01/03/95	Fernandes et al.	—	—	
<i>[Signature]</i>	5,387,915	02/07/95	Moussa et al.	—	—	
<i>[Signature]</i>	5,423,072	06/06/95	Iwashita et al.	—	—	
<i>[Signature]</i>	5,430,760	07/04/95	Dent	—	—	
<i>[Signature]</i>	5,440,281	08/08/95	Wey et al.	—	—	
<i>[Signature]</i>	5,448,621	09/05/95	Knudsen	—	—	
<i>[Signature]</i>	5,457,812	10/10/95	Siira et al.	—	—	
<i>[Signature]</i>	5,465,399	11/07/95	Oberholtzer et al.	—	—	
<i>[Signature]</i>	5,471,647	11/28/95	Gerlach et al.	—	—	

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					YES NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

<i>[Signature]</i>	Papadias et al., "A Space-Time Constant Modulus Algorithm for SDMA Systems", 1996, Proceedings, IEEE 46th Vehicular Technology Conference, pp. 86-90.
<i>[Signature]</i>	Talwar et al., "Blind Estimation of Multiple Co-Channel Digital Signals Arriving at an Antenna Array", 1993, Proc. 27th Asilomar Conference on Signals, Systems, and Computers, Vol. 1, pp. 349-342.
<i>[Signature]</i>	Rashid-Farrokhi et al., "Joint Power Control and Beamforming for Capacity Improvement in Wireless Networks With Antenna Array", 1996 IEEE GLOBECOM 1996, Vol. 1, pp. 555-559.

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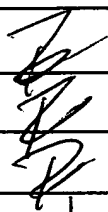
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	5,475,864	12/12/95	Hamabe	✓	✓	
	5,475,868	12/12/95	Duque-Anton et al.	✓	✓	
	5,497,505	03/05/96	Koohgoli et al.	✓	✓	
	5,515,378	05/07/96	Roy, III et al.	✓	✓	
	5,530,449	06/25/96	Wachs et al.	✓	✓	
	5,530,917	06/25/96	Andersson et al.	✓	✓	
	5,532,706	07/02/96	Reinhardt et al.	✓	✓	
	5,537,438	06/16/96	Mourot et al.	✓	✓	
	5,543,801	08/06/96	Shawyer	✓	✓	
	5,546,090	08/13/96	Roy, III et al.	✓	✓	
	5,548,813	08/20/96	Charas et al.	✓	✓	

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	Rashid-Farrokhi et al., "Transmit Beamforming for Cellular Communication Systems", Conference on Information Sciences and Systems, CISS-97; 3/1997, 4 pages.
	Rashid-Farrokhi et al., "Downlink and Uplink Capacity Enhancement in Power Controlled Cellular Systems", Proceedings, 1997 IEEE 47th Vehicular Technology Conference, Vol. 2, 5/97, pp. 647-651.
	Rashid-Farrokhi et al., "Downlink Power Control and Base Station Assignment", IEEE Communications Letters, Vol. 1, No.4, 07/97, pp. 102-104.

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<i>[Signature]</i>	5,553,074	09/03/96	Acampora	—	—	
<i>[Signature]</i>	5,555,445	09/10/96	Booth	—	—	
<i>[Signature]</i>	5,557,657	09/17/96	Barnett	—	—	
<i>[Signature]</i>	5,565,873	10/15/96	Dean	—	—	
<i>[Signature]</i>	5,566,209	10/15/96	Forssen et al.	—	—	
<i>[Signature]</i>	5,576,717	11/19/96	Searle et al.	—	—	
<i>[Signature]</i>	5,592,490	01/07/97	Barratt et al.	—	—	
<i>[Signature]</i>	5,596,625	01/21/97	LeBlanc	—	—	
<i>[Signature]</i>	5,603,082	02/11/97	Hamabe	—	—	
<i>[Signature]</i>	5,603,089	02/11/97	Searle et al.	—	—	
<i>[Signature]</i>	5,606,729	02/25/97	D'Amico et al.	—	—	

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OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

<i>[Signature]</i>	Rashid-Farrokhi et al., "Transmit Diversity and Equalization for Power Controlled Wireless Networks", Conference Record 31st Asilomar Conference on Signals, Systems, and Computers, Vol. 1, 11/97, pp. 620-624.
<i>[Signature]</i>	Xu et al., "Throughput Multiplication of Wireless LANs for Multimedia Services: SDMA Protocol Design", 1994, IEEE, pp. 1326-1332.
<i>[Signature]</i>	Swidlehurst et al., "Analysis of a Decision Directed Beamformer", IEEE Transactions on Signal Processing, Vol. 43, No. 12, 12/95, pp. 2920-2927.

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<i>[Signature]</i>	5,615,409	03/25/97	Forssen et al.	✓	✓	
<i>[Signature]</i>	5,621,752	04/15/97	Antonio et al.	✓	✓	
<i>[Signature]</i>	5,625,885	04/29/97	Nakazawa et al.	✓	✓	
<i>[Signature]</i>	5,638,375	06/10/97	Dettro et al.	✓	✓	
<i>[Signature]</i>	5,649,287	07/15/97	Forssen et al.	✓	✓	
<i>[Signature]</i>	5,673,291	09/30/97	Dent	✓	✓	
<i>[Signature]</i>	5,675,581	10/7/97	Soliman	✓	✓	
<i>[Signature]</i>	5,678,188	10/14/97	Hisamura	✓	✓	
<i>[Signature]</i>	5,684,836	11/04/97	Nagayasu et al.	✓	✓	
<i>[Signature]</i>	5,689,219	11/18/97	Piirainen	✓	✓	
<i>[Signature]</i>	5,689,502	11/18/97	Scott	✓	✓	

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<i>[Signature]</i>	Zhang et al., "Performance of a Modified Polling Strategy for Broadband Wireless LANs in a Harsh Fading Environment", 1991, GLOBECOM 1991, pp. 1141-1146.
<i>[Signature]</i>	US98/25364, PCT Search Report, 05/11/99.

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<i>Be</i>	5,694,416	12/02/97	Johnson	✓	—	
<i>Be</i>	5,697,066	12/09/97	Acampora	—	—	
<i>Be</i>	5,726,978	03/10/98	Frodigh et al.	✓	✓	
	5,732,076	03/24/98	Ketseoglou et al.	✓	✓	
	5,742,904	04/21/98	Pinder et al.	✓	✓	
	5,745,858	04/28/98	Sato et al.	✓	✓	
	5,748,676	05/05/98	Mahany	✓	✓	
	5,752,165	05/12/98	Hokkanen	✓	✓	
	5,774,461	06/30/98	Hyden et al.	✓	✓	
	5,809,009	09/15/98	Matsuoka et al.	✓	✓	
	5,809,019	09/15/98	Ichihara et al.	✓	✓	

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ATTY. DOCKET NO.

015685.P019C

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APPLICANT

Craig H. Barratt

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U.S. PATENT DOCUMENTS

*EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
<i>[Signature]</i>	5,818,918	10/06/98	Fujii	—	—	
<i>[Signature]</i>	5,819,182	10/06/98	Gardner et al.	—	—	
<i>[Signature]</i>	5,825,762	10/20/98	Kamin, Jr. et al.	—	—	
<i>[Signature]</i>	5,828,658	10/27/98	Ottersten et al.	—	—	
<i>[Signature]</i>	5,845,212	12/01/98	Tanaka	—	—	
<i>[Signature]</i>	5,867,123	02/02/99	Geyh et al.	—	—	
<i>[Signature]</i>	5,884,148	03/16/99	Bilgic et al.	—	—	
<i>[Signature]</i>	5,887,038	03/23/99	Golden	—	—	
<i>[Signature]</i>	5,905,721	05/18/99	Liu et al.	—	—	
<i>[Signature]</i>	5,909,470	06/01/99	Barratt et al.	—	—	
<i>[Signature]</i>	5,914,946	06/22/99	Avidor et al.	—	—	

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*EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
<i>Ta</i>	5,930,243	07/27/99	Parish et al.	<i>✓</i>	<i>✓</i>	
<i>Ta</i>	5,933,421	08/03/99	Alamouti et al.	<i>✓</i>	<i>✓</i>	
<i>Ta</i>	5,955,992	09/21/99	Shattil	<i>✓</i>	<i>✓</i>	
<i>Ta</i>	5,970,394	10/19/99	Arpee et al.	<i>✓</i>	<i>✓</i>	
<i>Ta</i>	5,973,638	10/26/99	Robbins et al.	<i>✓</i>	<i>✓</i>	
<i>Ta</i>	5,999,826	12/07/99	Whinnett	<i>✓</i>	<i>✓</i>	
<i>Ta</i>	6,005,854	12/21/99	Xu et al.	<i>✓</i>	<i>✓</i>	
<i>Ta</i>	6,009,124	12/28/99	Smith et al.	<i>✓</i>	<i>✓</i>	
<i>Ta</i>	6,018,317	01/25/00	Dogan et al.	<i>✓</i>	<i>✓</i>	
<i>Ta</i>	6,018,555	01/25/00	Mahany	<i>✓</i>	<i>✓</i>	
<i>Ta</i>	6,018,643	01/25/00	Golemon et al.	<i>✓</i>	<i>✓</i>	

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<i>[Signature]</i>	6,023,203	02/08/00	Parish	—	—	
<i>[Signature]</i>	6,061,553	05/09/00	Matsuoka et al.	—	—	
<i>[Signature]</i>	6,064,865	05/16/00	Kuo et al.	—	—	
<i>[Signature]</i>	6,067,324	05/23/00	Harrison	—	—	
<i>[Signature]</i>	6,108,565	08/22/00	Scherzer	—	—	
<i>[Signature]</i>	6,131,016	10/10/00	Greenstein et al.	—	—	
<i>[Signature]</i>	6,154,661	11/28/00	Goldburg	—	—	
<i>[Signature]</i>	6,185,412	02/06/01	Pentikainen et al.	—	—	
<i>[Signature]</i>	6,192,256	2/20/01	Whinnett	—	—	

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Application Number	09/689,228
Filing Date	October 11, 2000
First Named Inventor	Craig Barratt
Group Art Unit	2683
Examiner Name	T. Gessese
Attorney Docket Number	15685P019C

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